New and remarkable leafhoppers and planthoppers (Hemiptera: Auchenorrhyncha) from Switzerland

VALERIA TRIVELLONE1,2*, EVA KNOP3, TABEA TURRINI3, ALINE ANDREY4, JEAN-YVES HUMBERT4 & GERNOT KUNZ5*

1 Swiss Federal Research Institute WSL, Biodiversity and Conservation Biology, Via Belsoggiorno 22, 6500 Bellinzona, Switzerland
2 University of Neuchâtel, Laboratory of Soil Biology, Rue Emile Argand 11, 2000 Neuchâtel, Switzerland
3 University of Bern, Institute of Ecology and Evolution, Division of Community Ecology, Baltzerstrasse 6, 3012 Bern, Switzerland
4 University of Bern, Institute of Ecology and Evolution, Division of Conservation Biology, Baltzerstrasse 6, 3012 Bern, Switzerland
5 Karl Franzens University of Graz, Institute of Zoology, Universitätsplatz 2, 8010 Graz, Austria

* Contacts:
Valeria Trivellone, email: valeria.trivellone@gmail.com
Gernot Kunz, email: gernot.kunz@gmail.com / http://gernot.kunzweb.net

New and interesting records of Auchenorrhyncha from Switzerland are presented. Twelve species are new to Switzerland: Horvathianella palliceps (Horváth, 1897), Kelisia guttulifera (Kirschbaum, 1868), Kelisia praecox Haupt, 1935, Ribautodelphax vinealis Bieman, 1987, Acanalonia conica (Say, 1830), Arboridia simillima (Wagner, 1939), Athysanus quadrum Boheman, 1845, Bobacella corvina (Horváth, 1903), Chlorita cf. tamaninii Wagner, 1959, Hephathus nanus (Herrich-Schäffer, 1835), Hisshimonus kamatus Kuoh, 1976 and Lindbergina aurovittata (Douglas, 1875). Additional information is provided for the two rarely collected Conomelus lorifer Ribaut, 1948 and Emeljanovianus medius (Mulsant & Rey 1855).

Keywords: Switzerland, Hemiptera, Cicadomorpha, Fulgoromorpha, neobiota, alien species, vineyards, fauna.

INTRODUCTION

The known Auchenorrhyncha fauna of Switzerland comprises around 500 species (Mühlethaler et al. 2009). Generally the northern half is better known than the south, where most recent studies have revealed new Swiss records (e.g. Trivellone 2010, 2012; Trivellone & Pollini Paltrinieri 2011). Ongoing field research, modern sampling techniques such as suction sampling and acoustic recordings, genetics, climate changes and introduction of neobiota lead to a permanent increase of recorded species (e.g. Nickel et al. 2013, Hertach et al. 2015).

Records presented in this paper originate from different nature conservation and ecological studies carried out by the University of Bern and in the frame of the BioDiVine research-project (Trivellone et al. 2014) within the last four years. In addition some of the new records were discovered during private collecting by the first author.
**MATERIALS AND METHODS**

Specimens presented in this paper were collected by means of different insect collecting tools such as suction sampler, sweep-net or just by mouth aspirator. Specimens collected by the Community Ecology group of the University of Bern were sampled with a self-made «tree suction sampler» (Turrini & Knop 2015) in order to take standardized samples from silver birch (*Betula pendula*). The nomenclature follows Holzinger *et al.* (2003), Ribaut (1936, 1952), Nickel & Remane (2002) and Biedermann & Niedringhaus (2004). Information on habitat preference, host or food plant and distribution mainly follows Nickel (2003). Voucher specimens are preserved in the private collections of the first or last author.

**RESULTS**

**FULGOROMORPHA**

*Acanalonia conica* (Say, 1830) (*Fig. 1*)

First record from Switzerland: Ticino, Agno, green area [45°59'44.51'' N, 8°54'9.21'' E, 272 m], 1♀, 26.07.2014, mouth aspirator, leg. & det. Valeria Trivellone.

*Distribution*: USA, Northern Italy, Switzerland.

*Remarks*: *A. conica* is for the moment the only representative of the family in Europe. In North America this extremely polyphagous planthopper is commonly found feeding mixed with flatid species such as *Metcalfa pruinosa* (Say, 1830), *Anormenis chloris* (Melichar, 1902) or *Ormenoides venusta* (Melichar, 1902) (Wilson & Lucchi 2001). In Europe it was recorded for the first time in 2004 (Italy: Veneto) (D’Urso & Uliana 2004, 2006).

**DELPHACIDAE**

*Conomelus lorifer* Ribaut, 1948 (*Fig. 2A*)

Second record from Switzerland: Ticino, Cadenazzo, Vignette, vineyard [46°8’57.12” N, 8°55’11.89” E, 209 m], 1♀, 07.09.2011, D-vac, leg. & det. Valeria Trivellone.
**NEW AND REMARKABLE AUCHENERRHYNCHA (HEMIPTERA) FROM SWITZERLAND**

**Distribution**: Austria, Bosnia and Herzegovina, Bulgaria, Croatia, Czech Republic, France, Germany, Hungary, Italy, Macedonia, Poland, Romania, Slovakia, Slovenia, Switzerland, Ukraine, former Yugoslavia.

**Remarks**: *C. lorifer* feeds on *Juncus effusus* and probably other rushes. This species was recorded in Switzerland for the first time in 2010 (Trivellone 2010) and was collected in abundance from the phytocenosis of Sphagno-Caricetum rostratae in the cantons Ticino and Grisons. The single macropterous female of *C. lorifer* was collected in a vineyard under a high mowing disturbance regime with small scattered patches of the nearctic neophyte *Juncus tenuis*.

**Horvathianella palliceps** (Horváth, 1897) (Fig. 2B)

First record from Switzerland: Ticino, Lavertezzo, Montedato, vineyard [46°10’47.25” N, 8°53’16.87” E, 336 m], 5 ♂♂ 2♀♀, 24.06.2011, 10.08.2011 & 08.09.2011, D-vac and sweep-net, leg. & det. Valeria Trivellone.

**Distribution**: Austria, Bulgaria, Croatia, Czech Republic, Greece, Hungary, Italy, Iraq, Romania, Slovenia, Switzerland, Turkey, former Yugoslavia.

**Remarks**: *Horvathianella* is a monotypic genus and is known to feed on *Chrysoptogon gryllus*. In Switzerland this plant species is largely confined to xerothermic meadows and stony areas of southern parts of the country. In Swiss vineyards *C. gryllus* is quite rare and found only in steep embankments. *H. palliceps* specimens were collected in a vineyard where wide stands of *C. gryllus* were recorded.
Kelisia guttulifera (Kirschbaum, 1868) (Fig. 2C)

First record from Switzerland: Ticino, Bellinzona, Monte Carasso, vineyard [46°12′18.86″ N, 8°01′03.69″ E, 233 m], 1 ♂, 1 ♀, 17.06.2011, D-vac, leg. & det. Valeria Trivellone.

Second record from Switzerland: Ticino, Lavertezzo, Montedato, vineyard [46°10′47.25″ N, 8°53′16.87″ E, 336 m], 1 ♂, 24.06.2011, D-vac, leg. & det. Valeria Trivellone.

Third record from Switzerland: Ticino, Gordola, S. Antonio, vineyard [46°10′57.89″ N, 8°51′54.69″ E, 319 m], 3 ♂♂, 2 ♀♀, 24.06.2011 & 20.07.2011, D-vac, leg. & det. Valeria Trivellone.

Fourth record from Switzerland: Ticino, Cugnasco-Gerra, Gerra Piano, vineyard [46°10′31.74″ N, 8°54′05.64″ E, 199 m], 1 ♂, 24.06.2011, D-vac, leg. & det. Valeria Trivellone.

Distribution: Austria, Czech Republic, France, Germany, Great Britain, Greece, Lebanon, Lithuania, Netherlands, Poland, Switzerland, former Yugoslavia.

Remarks: This species is known to feed on sedges, in this study the specimens were collected on Carex spp. from different vineyards.

Kelisia praecox Haupt, 1935 (Fig. 2D)

First record from Switzerland: Ticino, Lavertezzo, Montedato, vineyard [46°10′47.25″ N, 8°53′16.87″ E, 336 m], 1 ♂, 1 ♀, 08.09.2011, D-vac, leg. & det. Valeria Trivellone.

Distribution: Austria, Bulgaria, Czech Republic, Estonia, Germany, Georgia, Greece, Italy, Kazakhstan, Iran, Latvia, Lithuania, Mongolia, Poland, Russia, Slovakia, Switzerland, former Yugoslavia.

Remarks: the species is frequently associated with Carex brizoides at moist sites, usually forest meadows or clearings (Nickel 2003). In this study, two specimens were collected on embankments inside a vineyard with Carex caryophyllea and Carex hirta.

Ribautodelphax vinealis Bieman, 1987 (Fig. 2E)

First record from Switzerland: Ticino, Mendrisio, Rancate, vineyard [45°52′23.29″ N, 8°58′3.38″ E, 343 m], 1 ♂, 03.08.2011, D-vac, leg. & det. Valeria Trivellone.

Second record from Switzerland: Ticino, Mendrisio, Somazzo, vineyard [45°52′37.53″ N, 8°59′30.34″ E, 537 m], 1 ♂, 26.04.2011, D-vac, leg. & det. Valeria Trivellone.

Distribution: Netherlands, Finland (Södermann 2007), Norway (Söderman et al. 2009), Germany, Switzerland.

Remarks: both specimens were collected inside vineyards on wild vegetation of embankments. This species is known from the Netherlands to be monophagous on Brown bent (Agrostis vinealis) in sandy dry grassland (Bieman 1987b). In the present study a quantitative vegetation sampling at the above-mentioned sites revealed the presence of black bent (Agrostis gigantea) and creeping bent (Agrostis stolonifera) which are closely related to A. vinealis.
CICADOMORPHA

CICADELLIDAE

*Arboridia simillima* (Wagner, 1939) (Fig. 2F)

First record from Switzerland: Valais, Orsières, extensively managed meadows [46°01’44’’ N; 07°09’82’’ E, 1022 m], 1 ♂, 17.08.2011, D-vac, leg. Aline Andrey, det. Gernot Kunz.

*Distribution in Europe*: Luxembourg (Nickel et al. 2010), Austria, Czech Republic, France, Germany, Hungary, Switzerland.

*Remarks*: In Germany *A. simillima* occurs on sun-exposed shrubs in open xero-thermic woodlands, mainly in slope and plateau situations on limestone, gypsum and porphyry. Host plants are *Rosa spinosissima* and other roses, probably *R. rubiginosa* and perhaps *R. canina* (Nickel 2003).

*Athysanus quadrum* Boheman, 1845 (Fig. 2G)

First record from Switzerland: Valais, south-east of Hérémence, south-east of Euseigne, extensively managed meadows at subalpine level that received different amount of water and irrigation since 2011 [46°10’09’’ N; 7°25’27’’ E, 1028 m], 1 ♂, 8 larvae, 28.06.2012, 1 ♀, 10.09.2012, D-vac, leg. Aline Andrey, det. Gernot Kunz.

*Distribution in Europe*: Norway, Sweden, Finland, Russia, Estonia, Latvia, Lithuania, Denmark, Belgium, Netherlands, Germany, Poland, Czech Republic, Belarus, France, Austria, Hungary, Ukraine, Romania, Slovakia, Switzerland.

*Remarks*: *A. quadrum* needs sunny, moist to wet, usually mesotrophic sites, mainly calcareous sedge fens and non-fertilized peat and straw meadows (Nickel 2002). Recent findings in Austria support *Lysimachia vulgaris* as being the host plant of this leafhopper (Nickel & Kunz unpubl.).

---

Fig. 3. *Bobacella corvina* (Horváth, 1903): A – female in dorsal view; B – female in ventral view. (photos: G. Kunz).

277
Bobacella corvina (Horváth, 1903) (Fig. 3)

First record from Switzerland: Valais, south-east of Saint-Martin, Eison, extensively managed meadows at subalpine level (that received 20 mm of irrigation water every week from May to August since 2011) [46°09’18” N; 7°28’10” E, 1768 m], 1 ♀, 26.07.2012, D-vac, leg. Aline Andrey, det. Gernot Kunz.


Remarks: This brachypterous leafhopper is rarely found in Europe, therefore almost nothing is known about its biology (see Della Giustina & Remane 2001, Holzinger 2009).

Chlorita cf. tamaninii Wagner, 1959 (Fig. 4)

First record from Switzerland: Ticino, Ludiano, Ronco Pizzotti, vineyard, [46°24’57.92” N; 8°58’11.39” E, 459 m], 2 ♂♂, 1 ♀, 21.06.2011, D-vac, leg. & det. Valeria Trivellone.

Distribution in Europe: Italy, Switzerland.

Remarks: In total 24 species of the genus Chlorita Fieber are known from the Palearctic region. Four of them: C. subulata (Ribaut, 1933), C. viridula (Fallen, 1806), C. tamaninii Wagner, 1959 and C. paolii (Ossiannilsson, 1939) belong to the Chlorita viridula species group and are closely related. Wagner (1959) published a key to distinguish the above-mentioned species. Up to now, in Switzerland only C. viridula (Ribaut 1933, Cerutti 1939) and C. paolii (Trivellone & Pollini Paltrinieri 2011) were recorded. In 2011, the first author had collected specimens with aedeagus morphological characteristics quite different from C. viridula and C. paolii. According to the key after Wagner (1959), two main subgroups of species were recognized based on the characteristics of the appendages of the aedeagus: appendages without a blunt tooth and convergent in the viridula-subulata subgroup; and appendages with a blunt tooth and divergent in the paolii-tamaninii subgroup. The appendages of the examined specimens do neither coincide perfectly with the first, nor with the second subgroup. The following description of a specimen is proposed as reference to further collections.

Determination: The genital plate with parameres and the appendices of the anal tube are illustrated in Figs 4A and 4B, respectively; they are similar to C. viridula after Le Quesne & Payne (1981). In the male, aedeagus with a pair of recurved appendages, longer than main stem, without tooth along outer margin; but hardly S-shaped in the middle (Fig. 4C) and ending in sharp-hooked apices (Fig. 4D).

Emeljanovianus medius (Mulsant & Rey, 1855) (Fig. 5)

Second record for Switzerland: Valais, Miège, south-west of Cordona, extensively managed meadows at subalpine level (that received 20 mm of irrigation water every week from May to August since 2011 and fertilisation in spring and autumn) [46°19’45” N; 7°33’08” E, 1153 m], 1 ♂ and 3 ♀, 03.07.2012, D-vac, leg. Aline Andrey, det. Gernot Kunz.

Distribution in Europe: Russia, Ukraine, Bulgaria, Greece (Drosopolous et al. 1986), Italy, Slovenia (Holzinger & Seljak 2001), France (Ribaut 1952, Guistina & Remane 2001), Switzerland.
Remarks: this species was described from the surroundings of Lyon by Mul-sant & Rey (1855). The only previous record from Switzerland originates from Châ-teau-d’Oex and was published under its junior synonym Deltocephalus reiberi Puton, 1877.

Hephathus nanus (Herrich-Schäffer, 1835) (Fig. 2H)

First record from Switzerland: Ticino, Bioggio, Righetto, vineyard [46°0’18.88” N, 8°53’45.11” E, 437 m], 1 ♂, 04.08.2011, D-vac, leg. & det. Valeria Trivellone.

Second record from Switzerland: Ticino, Monteceneri, Bironico-Cassona, vineyard [46°7’3.79” N, 8°55’59.18” E, 511 m], 2 ♂♂, 14.06.2014 & 04.08.2011, D-vac, leg. & det. Valeria Trivellone.
Fig. 5. *Emeljanovianus medius* (Mulsant & Rey, 1855): A – male in dorsal view; B – female in dorso-lateral view; C – aedeagus in ventral view; D – female in dorsal view; E – female in ventral view; F – aedeagus from the left (photos: G. Kunz).
NEW AND REMARKABLE AUCHENORRHYNCHA (HEMIPTERA) FROM SWITZERLAND

Third record from Switzerland: Ticino, Lavertezzo, Montedato, vineyard [46°10'47.25'' N, 8°53'16.87'' E, 336 m], 1 ♂, 20.07.2011, sweep-net, leg. & det. Valeria Trivellone.

Distribution: Albania, Austria, Balearic Is., Belgium, Britain, Bulgaria, Croatia, Czech Republic, Danish mainland, Estonia, Finland, France, Germany, Greece, Hungary, Italy, Latvia, Lithuania, Moldova, Poland, Portugal, Romania, Russia, Slovakia, Slovenia, Spain, Switzerland, Netherlands, Ukraine, former Yugoslavia.

Remarks: This species is usually found on sunny, oligotrophic and xerothermic sites, often in quite disturbed pastures (Nickel 2003). In this study some specimens were collected on vineyards floor vegetation and one specimen was unexpectedly collected from vine canopy.

Hishimonus hamatus Kuoh, 1976 (Fig. 6)

First record from Switzerland: Ticino, Agno, green area [45°59'44.51'' N, 8°54'9.21'' E, 272 m], 2 ♂, 21.06.2014, mouth aspirator, leg. & det. Valeria Trivellone.


Distribution: Australia, China, Ethiopia, Fiji, Japan, India, Indonesia, Slovenia, Italy? & Switzerland.
Remarks: The genus *Hishimonus* Ishihara belongs to the tribe Opsiini of Deltocephalinae, and is native to the Oriental region with records into the Ethiopian, Australian and eastern Palaearctic regions (Dai et al. 2013). Some species of *Hishimonus* are known to be of economic importance, because they were recorded as vector of phytoplasmas causing dwarf disease, Rhus yellows and witches broom (Weintraub & Beanland 2006; Seljak 2013). The first appearance in 2012 in Europe (Slovenia) was published by Seljak (2013). However, an increasing number of records (http://www.fitosanitario.re.it) and recent findings from the surroundings of Grado (Italy) suggest its primary introduction in the North of Italy. Nevertheless dissected material is still not available.

*Lindbergina aurovittata* (Douglas, 1875) (Fig. 21)
First record from Switzerland: Basel-Landschaft, Muttenz, urban settlement area, specimen collected on *Betula pendula* [47°31’32.53’’ N; 7°38’21.59’’ E, 289 m], 1 ♂ and 1 ♀, 17.08.2011, tree-suction sampler, leg. Tabea Turrini, det. Gernot Kunz.

Distribution: Ireland, England, Belgium, Luxembourg (Niedringhaus et al. 2010), Germany, France, Portugal, Italy, Bulgaria, Greece, Slovenia, Switzerland.

Remarks: This leafhopper produces two generations each year. The summer generation switches the host plant from different woody species (*Quercus* spp., *Fagus sylvatica*, *Alnus glutinosa*, *Corylus avellana* and *Betula pubescens*) to *Rubus fruticosus* and lays the eggs on this evergreen plant for overwintering. Adults during springtime switch again to their summer hosts.

DISCUSSION
The Auchenorrhyncha records in Switzerland increased by at least 30 species in the last seven years due to higher interest to involve leafhoppers and planthoppers in biodiversity studies. From this present study, seven new species were collected in vineyard agroecosystems. This can be explained with the use of modern sampling methods such as intense sampling of cover crops in vineyards. This xerothermic biotope harbours a high diversity of leafhoppers and planthoppers and was insufficiently studied in the South of Switzerland up to now. Most of the insect alien species have been unintentionally introduced by imported ornamental plants, and some of them are able to spread into man-made or disturbed habitats as well as into natural habitats (Roques et al. 2009). In this study, *Acanalonia conica* and *Hishimonus hamatus* have likely been introduced into Southern Switzerland by ornamental plant trade. Moreover, *H. hamatus* has become invasive on woody plants surrounding a vine growing area. Therefore we believe the species was introduced years ago and an immigration from North Italy would also be possible.

ACKNOWLEDGMENTS
The first author is grateful to the Natural History Museum in Lugano and the Dipartimento dell’Educazione, della Cultura e dello Sport (DECS) of the Canton Ticino, which have funded the identification of Auchenorrhyncha specimens collected in vineyards in Southern Switzerland. We thank Adalgisa Guglielmino and Christoph Bückle for the identification of *Chlorita cf. tamaninii* and for discussions regarding some taxonomic problems. We would also like to thank Pierluigi Scaramozzino for his helpful guidance in taking the photos of *Chlorita cf. tamaninii*. We are indebted also to Kees den Bieman for checking the specimens of *Ribautodelphax vinealis*. We also thank Herbert Nickel for his comments on the manuscript.

282
NEW AND REMARKABLE AUCHENORRHYNCHA (HEMIPTERA) FROM SWITZERLAND

LITERATURE


(received May 7, 2015; accepted June 6, 2015; published December 31, 2015)